

1 (1)

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3 1. (1st amended) A hard copy system comprising:

4 rewritable medium having a bistable, electrochromic, colorant susceptible to localized

5 electrical fields;

6 associated with said medium, an electrode subsystem producing said localized electrical

7 fields wherein said fields are associated with data to be printed; and

8 affixed to said electrode subsystem, a scanning navigation subsystem for positioning

9 said data on said medium.

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11 2. The system as set forth in claim 1, said electrochromic colorant further comprising:

12 at least one layer of a molecular colorant coating wherein molecules of the coating are at

13 least bichromal and subjectable to bistable switching between color states under influence of

14 said localized electric fields.

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16 3. The system as set forth in claim 2 comprising:

17 said molecules exhibit an electric field induced band gap change, occurring via a

18 mechanism selected from a group including (1) molecular conformation change or an

19 isomerization, (2) change of extended conjugation via chemical bonding change, and (3)

20 molecular folding or stretching.

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22 4. The system as set forth in claim 1, said electrode subsystem and navigation subsystem

23 further comprising:

24 means for downloading, storing, sequencing, and printing text and images.

1 5. The system as set forth in claim 1 wherein said electrode subsystem and navigation
2 subsystem are configured as a portable, hand-held, hard copy apparatus.

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4 6. The system as set forth in claim 1 further comprising:
5 means for scanning an original document and for providing a data set representative of
6 said original document as said data to be printed.

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8 7. The system as set forth in claim 1 wherein said electrode subsystem and navigation
9 subsystem are housed in a palm-sized device.

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11 8. The system as set forth in claim 1 wherein said electrode subsystem and navigation
12 subsystem are configured as a hand-held page wide electrode array device.

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14 9. The system as set forth in claim 1 comprising:
15 said colorant layer incorporates at least one layer of a first plurality of microcapsules
16 having bichromal, bistable colorant within the microcapsules.

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18 10. The system as set forth in claim 1 comprising:
19 said medium has a said colorant layer on each printing surface thereof.

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21 11. A hard copy rendering method comprising:
22 selectively providing localized electric fields, each of said fields conforming to a
23 predetermined picture element size;

1 portably transporting said fields across a printing medium such that a bistable
2 electrochromic colorant layer of said medium is subjected to said electric fields; and
3 manipulating said electric fields for producing printed data in said electrochromic colorant
4 layer and rendering said hard copy in rewritable form.

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6 12. The method as set forth in claim 11 wherein a first polarity of said localized electric fields
7 prints a picture element.

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9 13. The method as set forth in claim 12 wherein a reverse polarity of said first polarity of said
10 localized electric fields erases a picture element.

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12 14. The method as set forth in claim 11 in a portable, hand-held scan-print system.

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14 15. The method as set forth in claim 11 wherein said electrochromic colorant layer is at least
15 one layer of a molecular colorant coating wherein molecules of the coating are at least bichromal
16 and subjectable to bistable switching between color states under influence of said localized
17 electric field.

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19 16. The method as set forth in claim 15 wherein said molecules exhibit an electric field
20 induced band gap change, occurring via a mechanism selected from a group including (1)
21 molecular conformation change or an isomerization, (2) change of extended conjugation via
22 chemical bonding change, and (3) molecular folding or stretching.

17. The method as set forth in claim 11 wherein said colorant layer incorporates at least one layer of a plurality of microcapsules having bichromal, bistable colorant within the microcapsules.

18. The method as set forth in claim 11 comprising:
providing a hand held apparatus for rendering the hard copy;
in said hand held apparatus, further providing means for scanning an image and
converting said image to a data set such that said data set is said printed data.

19. The method as set forth in claim 18 comprising:
prior to printing the image, manipulating said data set for altering size of said image on
the hard copy.

20. The method as set forth in claim 18 comprising:
prior to printing the image, manipulating said data set for altering the appearance of said
image on the hard copy.

21. A scanning printer comprising:
a housing adapted for handheld use; and
mounted within said housing, an electrode array fixedly aligned for printing data rasters, a
navigation subsystem for tracking motion of said electrode array, a data port for transmitting data
with respect to said data rasters, and connecting said array, subsystem and port, electronic
circuitry associated with said tracking and said data rasters.

22. The apparatus as set forth in claim 21, said electrode array comprising:
a plurality of printheads tuned to provide pixel-sized, localized electrical fields.

23. The apparatus as set forth in claim 22 wherein said printheads are tuned for association
with molecular colorant print media.

24. The apparatus as set forth in claim 23 wherein said molecular colorant print media has a
substrate and at least one layer of molecular colorant on a printing surface of said substrate.

25. The apparatus as set forth in claim 24 wherein the molecular colorant layer is an
electrochromic colorant having at least one layer of a molecular colorant coating on said
substrate wherein molecules of the coating are at least bichromal and subjectable to bistable
switching between color states under influence of said localized electric field.

26. The apparatus as set forth in claim 25 wherein said molecules exhibit an electric field
induced band gap change, occurring via a mechanism selected from a group including (1)
molecular conformation change or an isomerization, (2) change of extended conjugation via
chemical bonding change, and (3) molecular folding or stretching.

27. The apparatus as set forth in claim 21 wherein said printheads are tuned for association
with a plurality of microcapsules having bichromal, bistable colorant within the microcapsules.

28. The apparatus as set forth in claim 27 further comprising:

sensors for generating image signals representative of an image as said sensors are scanned across the image, and in a fixed position relative to said sensors, navigation devices for forming at least one position signal indicative of inherent structure related properties correlated to said image signals as said sensors are scanned, a data processor connected to said sensors for processing said image signals and position signals, and a memory connected to said processor for storing image signals and position signals as said data rasters.

29. A handheld copier system comprising:

rewritable media having a bistable, electrochromic, colorant layer susceptible to localized electrical fields; and

in a hand-held scannable housing, sensor means for generating image signals representative of an image as said sensor means is scanned across the image, and in a fixed position relative to said sensor means, navigation means for forming at least one position signal indicative of inherent structure related properties correlated to said image signals as said sensor means is scanned, and connected to said sensor means, processor means for processing said image signals and position signals, connected to said processor means, memory means for storing image signals and position signals, and connected to processor means, electrode means for producing said localized electrical fields wherein said fields are associated with said image signals and said position signals for printing a copy of said image on said rewritable media.

30. The system as set forth in claim 29, said navigation means further comprising:

connected to said electrode subsystem, electrical generating means for producing said localized electrical fields.

31. The system as set forth in claim 29 said electrochromic colorant layer further comprises:
at least one layer of a molecular colorant coating wherein molecules of the coating are at
least bichromal and subjectable to bistable switching between color states under influence of
said localized electrical field.

32. The system as set forth in claim 31 comprising:
said molecules exhibit an electric field induced band gap change, occurring via a
mechanism selected from a group including (1) molecular conformation change or an
isomerization, (2) change of extended conjugation via chemical bonding change, and (3)
molecular folding or stretching.

33. The system as set forth in claim 31, the molecular colorant coating further comprising:
a mosaic pixel pattern of primary color pixels such that full color printing is produced by
said electrode subsystem on said media.

34. A method for scanning and printing, the method comprising:
scanning a document with a self-contained, hand held, scanning and printing apparatus;
and
printing data collected during said scanning on a rewritable medium with said apparatus
such that said document is reproduced on said medium.

35. (1st amended) The method as set forth in claim 34 wherein said rewritable medium is a
rewritable medium having a bistable, electrochromic, colorant susceptible to localized electrical

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fields.

36. (New) The method as set forth in claim 35 wherein said colorant is at least one layer of a molecular colorant coating wherein molecules of the coating are at least bichromal and subjectable to bistable switching between color states under influence of said localized electrical fields.

37. (New) A method of manufacture of a hand held scanning and printing apparatus, the method comprising:

in a hand held scanner device, aligning an array of electrodes for producing localized electrical fields for manipulating a bistable, electrochromic, molecular colorant on a rewritable medium; and

tuning said fields such that molecules of the colorant are subjectable to bistable switching between color states under influence of said fields such that data captured by said device is printable on said medium.